

# SAFETY MANAGEMENT IN POLAND IN THE CONTEXT OF INSTALLING THE ANTI-MISSILE SHIELD

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*Plus ratio quam vis*

Motto of Jagiellonian University

**Key words:** *Poland, safety management, anti-missile shield, analytic network process*

## **Abstract**

*Peace and safety are the most important challenges in the hierarchy of human needs. Poland in 2007 accepted the new Strategy of National Safety (SBNRP). Nowadays, Poland is before making a momentous decision about installation a part of American anti-missile shield (NMD). It is important not only for Poland, but also for Europe and world. In this article we want to present various alternatives of Poland safety management. The aim of the paper will be to choose the best variant for our country. In the article it was showed complexity of this problem (many criteria and subcriteria and their dependences and feedback. In this problem it is possible to find solution only by using multicriteria decision making methods. We used ANP (Analytic Network Process). In the paper we accepted three mutually non excluding defensive systems of Poland. As a result of conducted prioritization of the model, two mathematical formulae (multiplicative and additive – negative) give similar results for the common defence policy within EU, including middle and far of anti-missile shield.*

## **1. INTRODUCTION**

Peace and safety have always been the most important challenge in the hierarchy of human needs. For ages the human kind has weighted two different values – freedom and safety have been in conflict. In a sense one limits the other. You cannot have full freedom and full safety. Poland's fate was connected with numerous conflicts and wars whereby our country lost milion of its citizens. The off the communist regime in 1989 arose hope for stable peace in Poland and Europe. We stood in front of a chance of building a stable safety system. Polish negotiation and mediations in 1989 at around table between communist goverment and opposition are best case for other countries.

Unfortunately, safety does not have one, easily acceptable perspective for analysis. Understanding of safety shall always be related to one of theoretical academic orientations. In a perspective of a functional theory it is one of need of a system which has to be fulfilled in order for it to survive; it's a natural and desirable state of a system – everything that lowers the level of safety, from the point of functional theory is a social malfunction or pathology.

In turn, from a perspective of conflict theory, safety can be treated as a rather unstable parameter of a society (also international society), unstable because social systems in a systematic way “create conflicts, most frequently created in connection with division of rare and material goods but also such as authority, knowledge or information and prestige etc. Safety is therefore ephemeric creature – it appears and disappears as the interests of various social groups.

Further considerations assume after K. Żebrowska (2006) a definition of national safety as state of certainty, lack of threat a sense that basic state values such as survival, territorial integrity, political independence and freedom of international operations and development are state protected against external threats.

At the moment Poland faces a decision for installing part of American Missile Defence all over our country. This decision is important not only for Poland but also for Europe and the world. This decision can be analysed from four different perspectives – benefits, costs, opportunities and risks. Each of them, in turn, is a set of various factors – economic, social, political, technological and others. Creators of Polish foreign policy, looking at this problem in a complex way it attempts to solve this largest problem for us nowadays. Some of politicians and academicians supports a Missile Defense System, others are against. In the context of this discussion, the paper presents various alternatives of Poland safety management shall be presented. Therefore we aim to choose the best alternative for our country. The article also presents the complexity of this problem (significant number of criteria and subcriteria, as well as interdependencies and loops among factors). This problem can be solved only with use of multicriterial methods. To solve this problem we used Analytical Network Process (ANP) method (Saaty, 2004).

## **2. NATIONAL SAFETY STRATEGY FOR POLAND**

The notion of strategy means a theory and practice defining rules and general methods of operations by managerial bodies in a given field, framed to aims and their implementation with high level of correlation between space and time (B. Balcerowicz, 2002). National Safety Strategy (RPDA) (2007) defines national interests and formulates strategic goals in accordance with main goal in Constitution of Poland. The document states as follows:

- Poland is a sovereign and democratic state in Central Europe, with high demographic, political, military and economic potential. It desires to implement its national interests and aspirations of citizens to safe and dignified life in a peaceful and stable environment. It provides conditions for pursuing welfare while

honoring law and democratic values. At the same time it intends to input implementing common values and developing cooperations mechanisms within European Union, in euroatlantic and global scale, in order to guarantee lasting world safety;

- Poland operates in a complex and well developed international environment. As a member state of politically, militarily and economically strong organizations of North Atlantic Treaty and the European Union – it becomes a significant member of international cooperation. NATO and EU membership and the alliance with United States ensured high level of safety for Poland and are one of the basic guarantess of its internal development and international position.

Poland membership in the European Union caused widening and evolution of the notion of national interests and the need to strenghtene national and European identity of Poland in a united Europe. Probably the most important element of the above declaration is the last sentence – relating safety problems to the notion of national interest an pointing to the meaning of national interest and the consequences of Poland's membership in the EU to understanding of the national interest.

National interest is defined as follows:

Basic national interests are unchanging [...] and follow fundamental and unchanging values of Poland, and their implementation are the main need of state and its citizens. According to the Constitution of Poland they include: ensuring independence, territorial intactness, freedom, safety, human rights honoring and also preservation of national heritage and natural environmnt preservation within sustainable development conditions [ibid., p. 4].

National interests of the Republic of Poland can be divided into three groups: vital, important and other significant. Vital national interes are related to ensuring the survival of state and its citizens. It encompasses the need for preserving independence of state, it territorial integrity and intactness of borders, ensuring cictizens safety, human and basic rigths and also streghthening of democratic political order. Their implementation is an absolute priority of Poland's safety policy. Significant interests are guarantee of constant and sustainable country civilization and economic growth, providing conditions for the increase of society welfare, science and technology development and proper protection of national heritage and identity, and also natural environment [ibid., p. 5].

Other important national interest of Poland are related with the drive to have a strong state international position and a possibility of effective promotion of Polish interests within an international framework. They also include strenghtening of operational capabilities and effectiveness of the most importanat institutions as well as development of international relations based on respect for law and effective multilateral cooperation in accordance with goals and rules defined in the charter of United Nations [ibid., p. 5].

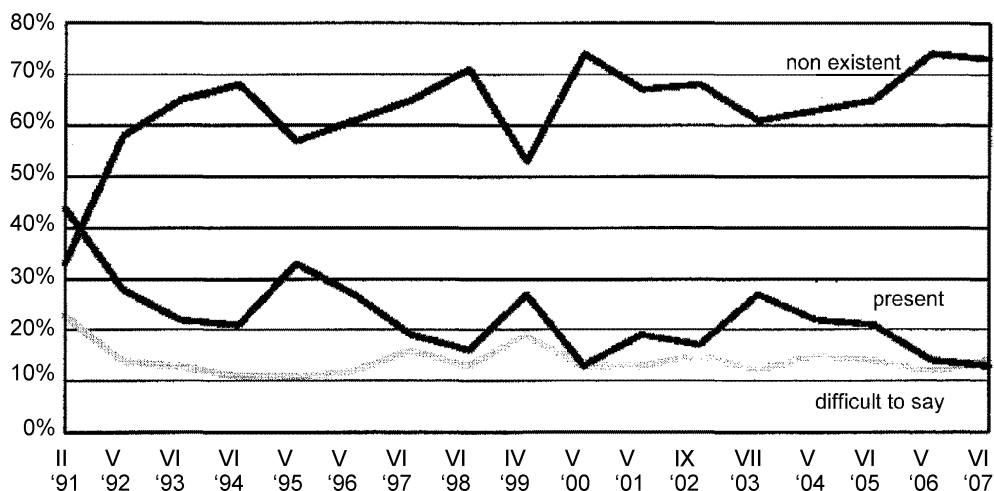
We claim that this definition of national interests are the most important part of strategy because for over 50 years Poland remained under the communist regime and could not shape its owns safety system but was to implement tasks assigned by the Soviets for the period of its war with the West. For a long time in its history Poland had not had a chance to become a subject of its own fate – key decisions for the nation were not located in Poland, but in the hands of Soviet power apparatus – its outbreak and caused deep national frustration. Thus the country deemed to lone fight with the

Germans and which nevertheless had an army with 600 thousand soldiers (both in the West and in the East) lost support of its allies who in Teheran and Jalta Treaties created new order in Europe.

Polish understanding of safety and national interest is related with all opportunities but is not limited to them. Poland achieved more to redefine its national and defense interests than many countries which use benefits related to democracy and welfare in postwar Europe. Safety in a perspective assumed in quoted document takes into account not only national interest and not only its requirements.

It is not single side understanding of safety as obligation to its preservation. It is a global understanding which assigns a distinct role to Poland – keeping all proportions – a definite role in keeping peace in the world.

Citizens live with a sense of growing level in national safety. Percentage of people convinced that there are no risks to Poland's independence is almost 5 times higher than percentage of people who think otherwise. In 1991 more people allowed possibility of threats than those who thought otherwise.



**Figure 18.1:** Sense of Threat to Poland's Independence in the Opinion of Respondents

*Source: Opinions on the situation of Poland in international relations and relations with Germany, Public opinion, CBOS Research Analysis, Warsaw, July, p. 14*

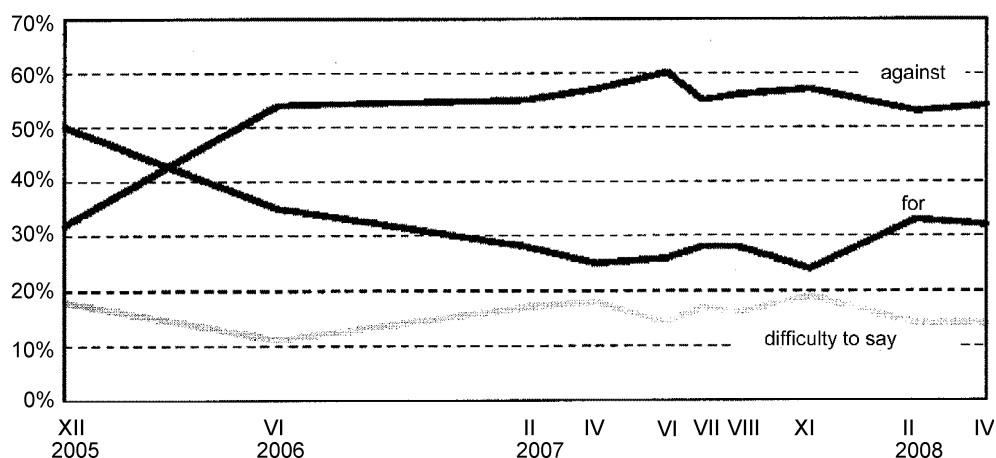
Increasing sense of safety creates and will create tensions among public opinion and government decisions stemming from international obligations assumed by the state. Citizens are not prone to share the opinion that Poland should participate in foreign military missions and should get engaged in military conflicts of today's world. It is illustrated by **Table 18.1**. The same happens in all democratic societies of the West. Citizens are more and more against the military engagement of their countries in conflicted areas of the world. Government must and do take that into account. Polish governments are in no better condition – they will also have to take into account critical opinion of their citizens.

**Table 18.1:** Support for Military Mission in Afganistan

Do you support participation of Polish army in Afganistan?	Date answer was given													
	XII 2001		I 2002		II 2002		IV 2002		X 2006		I 2007		VI 2007	
Definitely yes	17	45	16	43	19	47	22	57	4	16	17	45	3	17
Rather yes	28		27		28		35		12		28		14	
Neutral	5		8		7		5		5		5		5	
Rather no	23	44	24	43	22	42	18	32	29	76	30	75	30	78
Definitely no	21		19		20		14		47		45		48	
Difficult to say	6		6		5		4		8		5		5	

Source: Public opinion, CBOS Research Analysis, Warsaw June 2007, p. 15

Similarly unpopular decision in Poland is related to installation of Anti-Missile Shield (**Figure 18.2**). In 2005 the majority of respondents was ready to support this decision. After 3 years those proportions drastically changed – in April 2008 the majority was against and we dares that this percentage shall increase.

**Figure 18.2:** Support for Decision to Host Elements of Anti-Missile Defence System in Poland

Source: Public opinion, CBOS Research Analysis, Warsaw, May 2007, p. 15

### 3. DECISION ON INSTALLATION IN POLAND ELEMENTS OF AMERICAN ANTI-MISSILE DEFENSE SHIELD

Anti-Missile Defense Shield is a common notion for American, multinational, including all the world defense system. National missile defense (NMD) as a generic term is a military strategy and associated systems to shield an entire country against incoming Intercontinental Ballistic Missiles (ICBMs). The missiles could be intercepted by other missiles, or possibly by lasers. They could be intercepted near the

launch point (boost phase), during flight through space (mid-course phase), or during atmospheric descent (terminal phase). The overall limited U.S. nationwide antimissile program in development since the 1990s. After the renaming in 2002, the term now refers to the entire program, not just the ground-based interceptors and associated facilities. Other elements yet to be integrated into NMD may include sea-based, space-based, laser, and high altitude missile systems. The NMD program is limited in scope and designed to counter a relatively small ICBM attack from a less sophisticated adversary. Unlike the earlier Strategic Defense Initiative program, it is not designed to be a robust shield against a large attack from a technically sophisticated adversary.

The system is coordinated by Missile Defense Agency, its mission is to develop, test and prepare for deployment of a missile defense system. Using complementary interceptors, land-, sea-, air- and space-based sensors, and battle management command and control systems, the planned missile defense system will be able to engage all classes and ranges of ballistic missile threats. Our programmatic strategy is to develop, rigorously test, and continuously evaluate production, deployment and operational alternatives for the ballistic missile defense system. Missile defense systems being developed and tested by MDA are primarily based on hit-to-kill technology. It has been described as hitting a bullet with a bullet – a capability that has been successfully demonstrated in test after test

MDA divides its systems into 3 categories, boost phase, mid-course phase and terminal phase, each corresponding to a different phase of the threat ballistic missile flight regime. Each phase offers different advantages and disadvantages to a missile defense system (see missile defense classified by trajectory phase), thus the layered defense approach concept should improve overall defense effectiveness

At the moment Poland faces an important decision on installation elements of American Anti Missile Shield on its territory. In the USA the opponents argued against high costs and technical feasibility of NMD (National Missile Defence). High cost, political dangers, possible armament drive and worsening of international relations. Nevertheless the Congress accepted NMD project.

In the USA the decision process on NMD (National Missile Defence) was supported by Prof. T. Saaty (2001).

Tests on public opinion in Poland show that the majority of society is against building anti missile shield in Poland. Some politicians, citizens and academicians supports installation of anti missile shield in Poland, others are against. In the most popular internet search engines show over milion record where anti missile shield in Poland is entered.

In this context, the article presents various alternatives on Poland's national safety management.

### **3.1. ALTERNATIVES TO POLAND'S SAFETY MANAGEMENT**

We assumed three possible defense systems for Poland:

- Installation of the National Missile Defense system in Poland;
- Common defense policy within the structure of the EU including building union military forces (within European Safety Policy and Defence ESP&D);
- Common defense policy within NATO (NATO consists of 21 countries belonging to the EU as well).

The above alternatives are considered in Poland by both politicians and academics. Each of them has its positive sides as well as its limitations. In order to choose the best alternative to solve the problem we used Analytical Network Process. It makes it possible to undertake an optimal variant of our country defense. In the ANP method comparison direction stems from connections between elements and roles of common interdependencies.

Decisional ANP structures “benefits”, “costs”, “opportunities” and “risks” are a network of mutual relations among the most important factors taken into account in a decision process. Those networks are constructed in four fields of possible Poland’s national safety management system; economic, political, social and technological.

The assumed problem was solved with use of Super Decisions software.

### 3.2. OPTIMAL DECISION CHOICE STEPS

Steps in the choice of the best defense strategy for Poland within the framework of Analytical Network Process can be presented as follows:

- (1) Presenting a decisional problem in details in the context of ANP method that is decision’s goals, criteria, subcriteria, actors – decision process participants; their objectives, points of view on the problem to be considered, possible alternatives of Poland’s best defence strategy. Providing detailed factors, which shall influence the final decision.
- (2) Describing control criteria and subcriteria within four control hierarchies for merits (personal merits): benefits (*B*), opportunities (*O*), costs (*C*) and risks (*R*) of the above-defined decision.
- (3) In control criteria subsets for BOCR we build a structure in the form of a hierarchy tree including key elements (criteria and subcriteria). Each subnet is constructed in the form of a cluster with objectives’ nod. Clusters of the main BOCR merits (benefits, opportunities, costs and risks) Subcriteria clusters are related to one of the main criteria. In order to calculate priorities we connect goals with criteria and each criterion with their subcriteria. We make pairwise comparisons for all network elements in order to calculate priorities for subcriteria. Each subcriterion is a potential “control criterion” in the further network analysis.
- (4) We make criteria pairwise comparisons separately for each BOCR, and next subcriteria to criteria in the four control hierarchies (on prof. T.L. Saaty’s fundamental scale). In the case of benefits and opportunities, we ask a question while comparing criteria and subcriteria what ensures the largest benefits in the best defense strategy for Poland and what constitutes the largest hidden benefits – opportunities in relation to the control criterion. In the case of costs and risks a question should be asked about what is the largest cost in the preparation phase and at the moment Poland building defence strategy or what shall lead to the largest hidden costs that is risks.
- (5) We calculate global priorities by multiplying priorities for a criterion times a priority for a subcriterion for the four designated BOCR merits.

- (6) For further implementation of decision process, 20–30% of the most important subcriteria from the entire network (with priorities over 3%), for the four BOCR control criteria, account approximately 70–80% of the total sum of priorities for all subcriteria. These are usually those sub criteria, which achieved the merits for the global priorities over 3%. The values of global priorities for subcriteria were calculated by dividing each local priority for a subcriterion by four (four BOCR control criteria). It significantly simplifies our decision process to follow, because we only analyze the most important criteria determining defense strategy for Poland, following the Vilfredo Pareto “20/80” rule. This rule, formulated by the Italian economist, means that 80% of results achieved by each manager follows implementation of 20% of his tasks whereas 80% of activities are responsible only for 20% of effects.
- (7) Constructing a general clusters’ (or components’) network and their elements, concerning all BOCR control criteria. Subnets in relation to control criteria are the lowest network level in the model of Poland’s bulding military forces.
- (8) Building decision subnets for each selected control criterion. During that step we introduce a cluster of alternatives – i) Installation of the National Missile Defense system in Poland (NMD – National Missile Defence), ii) Common defense policy within the structure of the EU, iii) Common defense policy within NATO. A cluster of the above defined alternatives must be present in each decision subnet with other clusters. In the ANP method and the Super Decision software supporting solution of multicriteria network, problem are a real network loop, and resemble networks between coal mine, steelworks and coal power plant.
- (9) For each control criterion (or subcriterion) those clusters are defined (with their elements) which influence other clusters (or elements) in relation to a given criterion or they themselves can be under influence of other clusters or elements. Importance (being under influence or exerting influence) must be applied to all criteria of all control hierarchies for a total response. In a graphic presentation of the model, clusters are connected with arrows following their external and internal dependencies and influences. There is an arrow from each cluster connecting it to another cluster, which influences that cluster or its elements.
- (10) We make appropriate connection between nodes and make pairwise comparisons of clusters with each other, in relation to a given criterion. In benefits (*B*) decision subnet we make pairwise comparisons of clusters (with using T. Saaty’s fundamental scale), by asking questions: which cluster (or its elements) are the most beneficial in the context of analyzed subcriterion? Similar questions are asked in Opportunities (*O*) subnet. The best alternative gives the highest priorities for benefits and opportunities. In Risks (*R*) and Costs (*C*) decision subnets, during the cluster pairwise comparisons we ask questions: which are more expensive or risky? The worst alternative gives the highest priorities for Risks and Costs.
- (11) For each control criterion we construct a supermatrix. Appropriate categories should include priorities following cluster comparisons in the net.



- (12) Pairwise comparisons of elements within clusters with respect to their influence on each element in subsequent clusters with which they are connected (external dependence) or elements of the same clusters (internal interdependence). While making comparisons we should always take into account the criterion which is a context for our comparisons. Elements are compared with respect to the influence of a given element which influences another element to a greater extent and the greater importance within T. Saaty's scale than another element it is compared to. Those comparisons must take into account control criterion or control hierarchy criterion.
- (13) Cluster comparisons with respect to their influences on the control criterion. Calculated weights are used to weigh elements of respective blocks of supermatrix columns. Zero is assigned to those comparisons, where there is no influence, between compared clusters. This way we obtain a supermatrix stochastically weighted.
- (14) Estimating the importance of each subsystem, that is benefits (*B*), opportunities (*O*), costs (*C*) and risks (*R*) of a problem in question. In taking any decision its significance differs in relation to (*B*), opportunities (*O*), costs (*C*) and risks (*R*). Hence we have to prioritize them by estimating strategic criteria. Those criteria constitute our system of merits. With respect to merits we estimate the importance of best alternatives (*B*, *O*, *C*, *R*) of the solving problem – for example very high, high, medium, low, very low.
- (15) Synthesizing priorities limited by weighing each idealized criteria. We choose the best alternative using the multiplicative formula ( $BO/CR$ ) by dividing a multiplication of variant priorities for benefits and opportunities by the multiplication of costs and risks. The other formula for choosing the best variant is additive – negative ( $bB + oO - cC - rR$ ). In the latter formula the importance of each subsystem i.e. benefits (*b*), opportunities (*o*), costs (*c*) and risks (*r*) for a given problem must be estimated. The optimal variant has a higher result.
- (16) Sensitivity analysis of a final result. The analysis concerns “what – if” questions. It makes possible to determine whether the final answer is stable and to what extent it will allow to change the input data concerning evaluations or priorities. It is particularly interesting to see whether those changes can be measured with a compatibility index (SI).

### 3.3. ESTIMATING CRITERIA AND SUBCRITERIA WITHIN FOUR MERITS – COSTS, BENEFITS, OPPORTUNITIES AND RISKS

Within assumed merits the following criteria were analysed: economic, social, technological and political. Next, main criteria were compared with each other. Pairwise comparisons started with verbal comparison between elements on Saaty's fundamental scale from balanced (1) do extreme (9) (Table 18.2). After comparisons of verbal criteria, numerical priorities were calculated, based on the comparison matrix. In turn, within assumed criteria, appropriate subcriteria were selected to optimally characterize various alternatives. After their pairwise comparisons, local priorities were calculated.

**Table 18.2:** Saaty's 9-point Fundamental Scale for Pairwise Comparisons

Importance/ Preference/Likelihood	Definition	Explanation
1	equal impor- tance/preference/likelihood	two elements contribute equally to the goal/parent element
3	weak dominance	experience or judgment slightly favors one element over another
5	strong dominance	experience or judgment strongly favors one ele- ment over another
7	demonstrated (very strong) dominance	experience or judgment strongly very strongly favors one element over another (an element's dominance is demonstrated in practice)
9	absolute dominance	the evidence favoring an element over another is affirmed to the highest possible order
2, 4, 6, 8	intermediate values	further subdivision or compromise if needed
1.1–1.9		for elements closely related
Inverse values		transitivity of comparisons

All values were presented in **Table 18.3**. They show that the most optimal value to build Poland's defense strategy is constant economic growth and closer relations with the European Union. Opportunities, in turn, be seen in the sale of military equipment and assistance in increasing energetic safety.

**Table 18.3:** Prioritization of Control Criteria I of ANP Model Elements of Benefits, Costs, Opportunities and Risks of Poland's Defence Strategy

Merits	Criteria	Sub-criteira	Local priorities	Global priorities
Benefits (B)	economic (0.539)	reforms of the military forces	0.105	0.015
		development of military industry	0.258	0.038
		constant economic growth	0.637	0.080
	social (0.106)	strengthening command system in Polish army	0.833	0.022
		strengthening alliance with the USA	0.167	0.004
	technological (0.138)	modern air defense system	0.125	0.004
		modern anti-missile defense system	0.875	0.030
	political (0.217)	closer cooperation with the EU	0.833	0.045
		american guarantee for the ational security for all citizens	0.167	0.009
Opportunity (O)	economical (0.540)	long-term military support	0.268	0.036
		contracts for production of the equipment for american army	0.117	0.015
		selling military equipment	0.614	0.083
	social (0.297)	economic investments in the Slupsk region	0.167	0.012
		support in the area energy safety	0.833	0.061
	political (0.163)	lifting visas for Polish visitors to America	0.833	0.034
		moral support form American Polish community	0.167	0.007

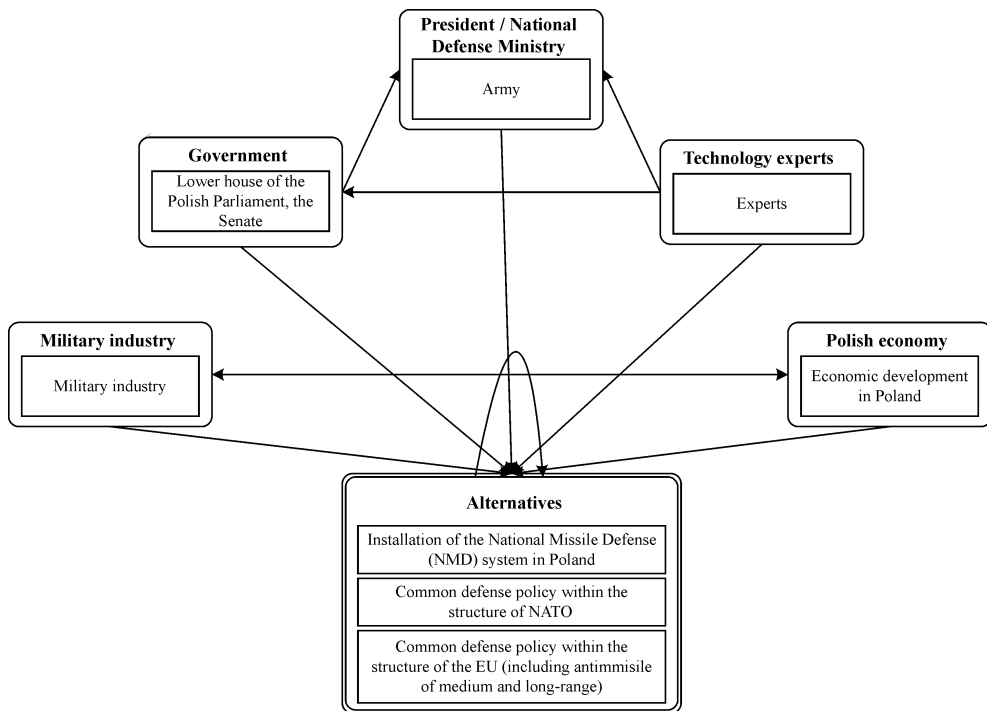
Costs (C)	economical (0.649)	modernisation of Polish army	0.201	0.032
		negative impact on the environment	0.066	0.011
		participation in the financing of the NMD system	0.103	0.017
		building long and medium range missiles	0.629	0.102
	social (0.279)	losing part of freedom	0.833	0.058
		extraterritoriality of the US base in Poland	0.167	0.047
	political (0.072)	deterioration of relationship with the EU	0.833	0.012
		risk of terrorist attack	0.167	0.003
Risks (R)	economical (0.119)	alienation of Poland in the EU	0.833	0.025
		weakening position of Poland in NATO	0.167	0.005
	social (0.098)	weakening nation identity	1.000	0.024
	political (0.497)	infiltration and dependency on the USA	0.105	0.013
		enemies in the Islamic communities	0.258	0.032
		worsening relations with Russia	0.637	0.079
	technological (0.286)	mistakes in the American defensive systems	0.333	0.024
		mistakes in the offensive systems of the enemy countries to the USA	0.067	0.048

### 3.4. BUILDING DECISION SUBNETS FOR EACH SPECIFIC CRITERION

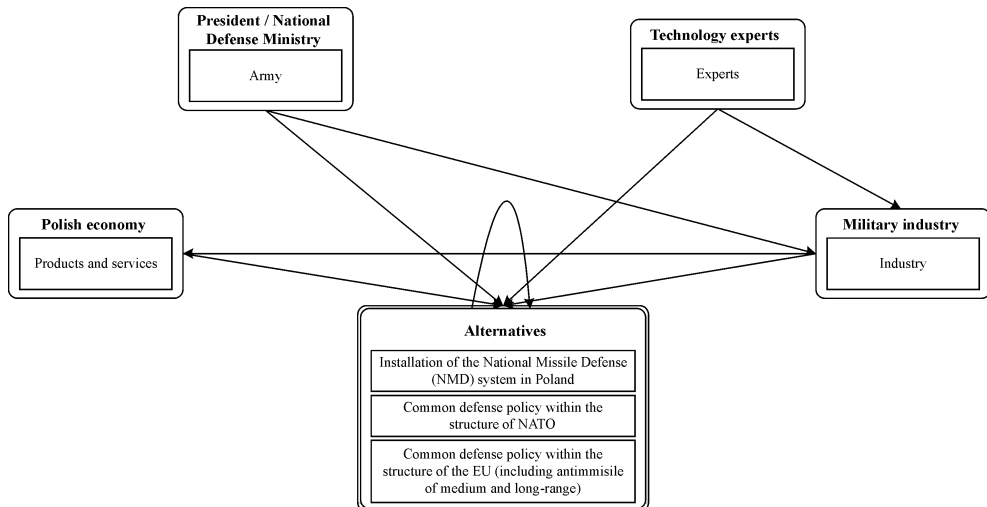
At this stage we introduce a cluster of three alternatives into the model. We build subnets for selected subcriteria from the previous stage in relation to the four values: benefits, costs, opportunities and risks. We compare clusters with each other in the Saaty's scale. Selected decision subnets for the 4 criteria are shown in respective **Figures 18.3–6**.

### 3.5. ESTIMATING PRIORITIES FOR BASIC VALUES FOR *B* – BENEFITS, *O* – OPPORTUNITIES, *C* – COSTS, AND *R* – RISKS

To estimate those values it is necessary to build a separate network in Super Decisions network that is, to some extent superior to our network built so far. Prof. T. Saaty names that “view onto our problem from a more general perspective – a bird's eye view”. Network built in such way is presented in **Figure 18.7**.



**Figure 18.3:** Subnet for Development of Military Industry



**Figure 18.4:** Subnet for Modernisation of Polish Army

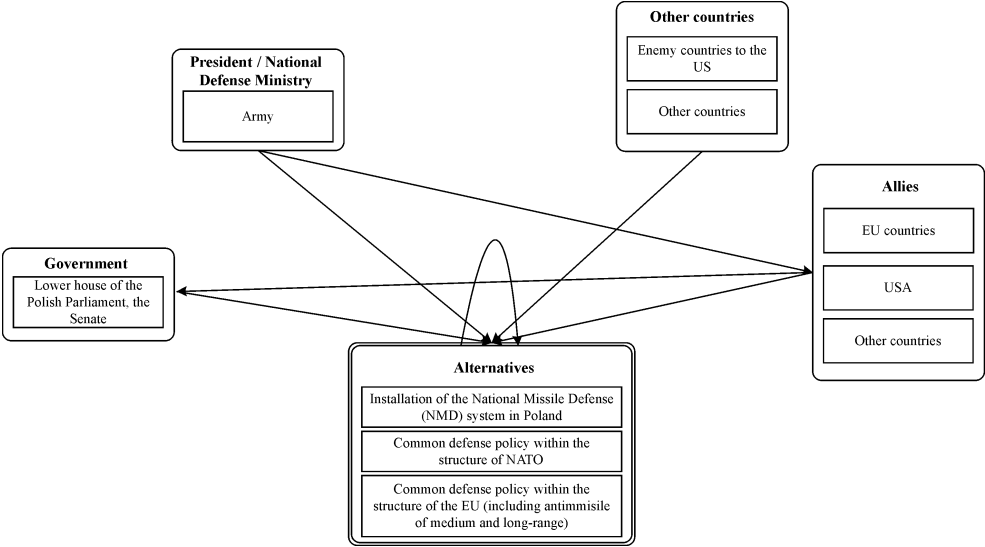


Figure 18.5: Subnet for Enemies in Islamic Communities

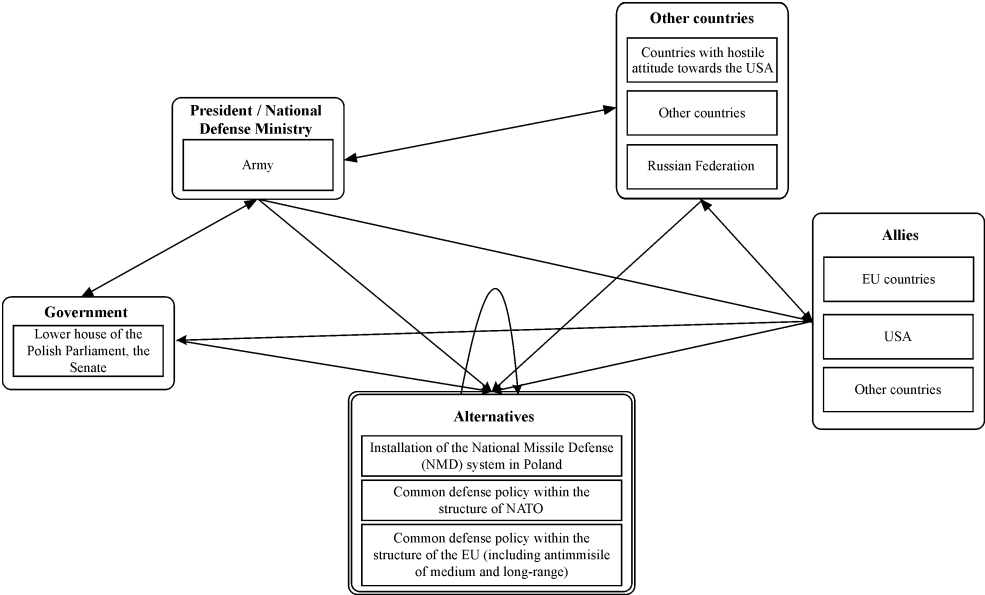
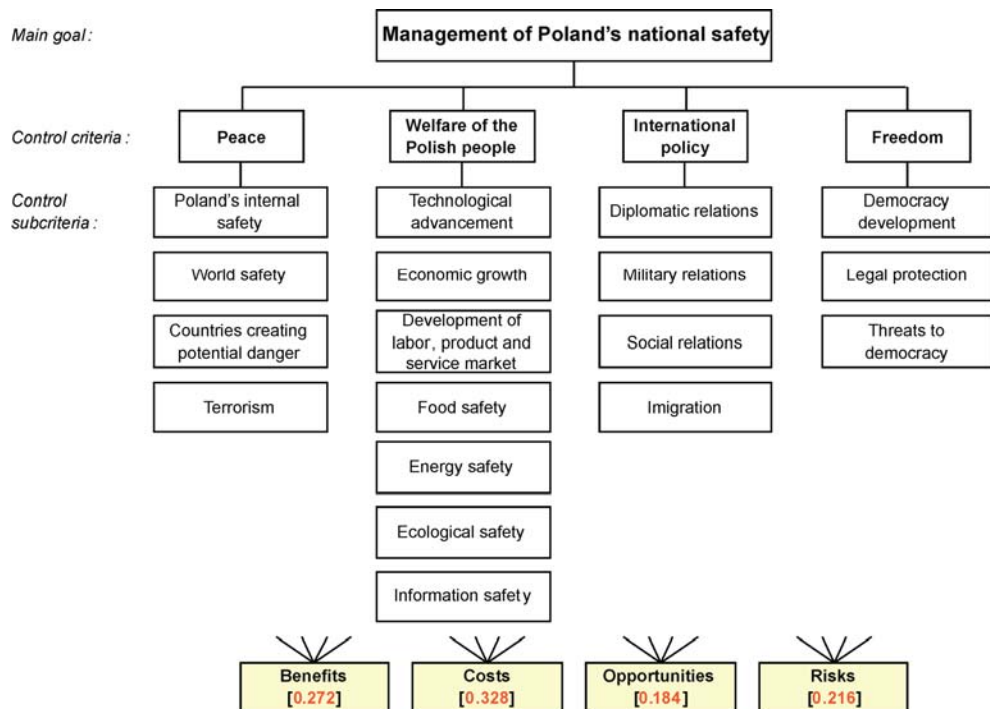


Figure 18.6: ANP Network for Social Risks of “Worsening of Relations with the Russian Federation”

Comparing criteria and subcriteria among each other we set priorities for them. Each strategic criterion was further divided into respective subcriteria, used for ranking of BOCR subsystems. Individual criteria and their priorities to estimate the weight (importance) of BOCR were presented in **Table 18.4**.



**Figure 18.7:** Management of Poland's National Safety (Strategic Criteria Model)

**Table 18.4:** Assessment of the Strategic Criteria – Importance of BOCR

Personal criteria	V. high	High	Medium	Low	V. low	Pi
V. high	1	2	3	4	5	0.42
High	$\frac{1}{2}$	1	2	3	4	0.26
Medium	$\frac{1}{3}$	$\frac{1}{2}$	1	2	3	0.16
Low	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	1	2	0.10
V. low	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	1	0.06
					$\Sigma$	1.00

Estimation of strategic criteria make it possible to relate received results within BOCR subsystems and calculating of final result.

### 3.6. OPTIMAL ALTERNATIVE CHOICE

In choosing the optimal decision alternative regarding Poland's defense strategy we connected values of priorities of BOCR network variant. It was implemented in two ways – as the first a multiplicative mathematical formula BO/CR was used, whereby

priorities values were divided for specific alternatives from benefits and opportunities models by respective costs and risks models. The best alternative assumes the highest calculated quotient. Results were presented in **Table 18.5**.

**Table 18.5:** Final Scores of ANP Analysis

Alternatives/Merits	Benefits 0.272	Costs 0.184	Opportunities 0.328	Risks 0.216	Multiplicative BO/CR	Additive-Negative $bB + oO - cC - rR$
Installation of the National Missile Defense system in Poland	0.487	0.398	0.380	0.358	1.4226	0.0037
Common defense policy within the structure of the EU	0.542	0.615	0.429	0.405	1.9185	0.0324
Common defense policy within the structure of NATO	0.386	0.203	0.412	0.507	0.3751	-0.1023

The table proves that the best alternative for Poland's defense strategy is Common defense policy within EU, including middle and far range of anti missile shield. Installation of elements of American National Missile Defense Shield NMD is slightly worse, whereas the worst is common defense policy within NATO.

#### 4. FINAL CONCLUSIONS

- 32 BOCR criteria included in ANP model comprise economic, social, technological and political factors that determine national safety system in Poland;
- As a result of conducted prioritization two mathematical formulas give similar results for the following alternative: Common defense policy within EU, including middle and far range of anti missile shield;
- Sensitivity analysis can to a small extent change the value of priorities of considered alternatives, but it requires extreme assumptions for prioritizing of BOCR and proper control criteria;
- Analytical Network Process method made us realize the complexity of national safety and made numerical priotization of various element in subsystems of benefits, costs, opportunities and risks possible;
- This method can be used to solving several conflicts in order to set peace.

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